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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,227	07/17/2006	Kenneth E. Welker	14.0250-PCT-US	7982

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EXAMINER	
HUGHES, SCOTT A	

ART UNIT	PAPER NUMBER
3663	

NOTIFICATION DATE	DELIVERY MODE
05/15/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/597,227	WELKER ET AL.	
	Examiner	Art Unit	
	SCOTT A. HUGHES	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-69* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-69* is/are rejected.

7)☒ Claim(s) *17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 June 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/11/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group II in the reply filed on 1/8/2009 is acknowledged. The traversal is on the ground(s) that the amendments to the claims create unity of invention between Groups I and II. This argument and amendments to the claims are persuasive, and the previous restriction requirement is withdrawn.

Claim Objections

Claim 17 is objected to because of the following informalities: Claim 17 recites the limitation “include a one of a plurality of a plurality of inertial positioning devices" when it appears the claim should read "include one of a plurality of inertial positioning devices.” Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3-5 recite the limitation “wherein the seismic cable,” therefore requiring that a seismic cable be present. However, claim 2 from which claims 3-5 depend, makes a seismic an optional component. As the seismic cable is not required to be present by claim 2, there is a lack of antecedent basis in the claims for requiring the cable to be present in claims 3-5. As claim 2 allows for a seismic receiver, steering

device, or source instead of the cable, there is a lack of antecedent basis in requiring the cable to be present in claims 3-5.

Claims 6-7 require that a steering device or source be present while claim 2 makes these optional. These claims are indefinite for the same reasons given above with respect to claims 3-5 and cables.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-69 are rejected under 35 U.S.C. 102(e) as being anticipated by Wilson (US20040073373).

The applied reference has a common assignee (WesternGeco) with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

With regard to claim 1, Wilson discloses an apparatus for use in a marine seismic survey (abstract), comprising:

a seismic survey object (Fig. 1) ([0020]); and

an inertial measurement unit 220 coupled to the seismic survey object at a known point and from which the movement of the seismic survey object can measured during a seismic survey such that the position of the known point during the marine seismic survey can be determined ([0021]; [0024-0039]).

With regard to claim 2, Wilson discloses that the seismic survey object comprises one of a seismic cable, a seismic receiver, a steering device, and a seismic source ([0020-0021]; [0030]).

With regard to claim 3, Wilson discloses that the seismic cable comprises one of a streamer and an ocean bottom cable ([0022]).

With regard to claim 4, Wilson discloses that the seismic cable includes one of a sensor module, a steering device, and an inertial positioning device in which the inertial measurement unit is housed ([0020-0021]; [0030]).

With regard to claim 5, Wilson discloses that the seismic cable includes a plurality of acoustic receivers ([0020]; [0022]).

With regard to claim 6, Wilson discloses that the steering device comprises one of a Q-fin and a bird ([0020]).

With regard to claim 7, Wilson discloses that the seismic source comprises at least one of an air gun and a vibrator ([0020]).

With regard to claim 8, Wilson discloses an inertial positioning device in which the inertial measurement unit is housed ([0024]).

With regard to claim 9, Wilson discloses that the inertial positioning device further comprises:

a power system for the inertial measurement unit;

a communication interface; and

a battery powering the power system and the communication interface ([0024-0034]).

With regard to claim 10, Wilson discloses that the inertial measurement unit comprises a plurality of accelerometers and gyroscopes ([0024-0028]).

With regard to claim 11, Wilson discloses that the inertial measurement unit comprises a micro-electromechanical inertial measurement unit ([0026]). The ADXL202/210 accelerometer is a MEMS inertial measurement unit (See Analog Devices ADXL202/ADXL210).

With regard to claim 12, Wilson discloses that the inertial positioning device comprises an acoustic node determined by either an acoustic source or receiver ([0030]).

With regard to claim 13, Wilson discloses that the acoustically determined point comprises one of an ultra-short baseline acoustic system, a short baseline acoustic system, or a distance measurement acoustic system ([0030]).

With regard to claim 14, Wilson discloses a marine seismic spread (Fig. 1), comprising:

a plurality of seismic survey objects (Fig. 1) ([0020-0021]), including a plurality of acoustic receivers and at least one acoustic source ([0020]), distributed over a survey area from at least one known point ([0020-0022]; [0029-0033]); and

a plurality of inertial positioning devices 220 coupled to the seismic survey objects at known points and capable of taking inertial measurements of the movement of the seismic survey objects relative to the known point such that the position of the known points during the marine seismic survey can be determined ([0021]; [0024-0039]).

With regard to claim 15, Wilson discloses that the plurality of seismic survey objects include a plurality of seismic cables comprised of the acoustic sources and the inertial positioning devices (Fig. 1) ([0020-0022]).

With regard to claim 16, Wilson discloses that the seismic cables comprise one of a plurality of streamers and a plurality of ocean bottom cables ([0022]).

With regard to claim 17, Wilson discloses that the seismic survey objects include a one of a plurality of a plurality of inertial positioning devices and a plurality of steering devices in which the inertial positioning devices are housed ([0020-0021]; [0024-0025]; [0028-0034]).

With regard to claim 18, Wilson discloses that the plurality of acoustic receivers comprise a plurality of hydrophones or geophones ([0020]; [0031]).

With regard to claim 19, Wilson discloses that the inertial measurement unit is housed in an inertial positioning device housed ([0020-0021]; [0024-0025]; [0028-0034]).

With regard to claim 20, Wilson discloses that the inertial positioning device further comprises:

a power system for the inertial measurement units;

a communication interface; and

a battery powering the power system and the communication interface housed ([0020-0021]; [0024-0025]; [0028-0034]).

With regard to claim 21, Wilson discloses that at least one of the inertial measurement units comprises a plurality of accelerometers and gyroscopes ([0024-0028]).

With regard to claim 22, Wilson discloses that the inertial measurement unit comprises a micro-electromechanical inertial measurement unit ([0026]). The ADXL202/210 accelerometer is a MEMS inertial measurement unit (See Analog Devices ADXL202/ADXL210).

With regard to claim 23, Wilson discloses that the inertial positioning device further comprises an acoustic node determined by either an acoustic source or receiver ([0030]).

With regard to claim 24, Wilson discloses that the acoustic source comprises one of an ultra-short baseline acoustic system, a short baseline acoustic system, or a distance measurement acoustic system ([0030]).

With regard to claim 25, Wilson discloses an apparatus for use in a marine seismic survey, comprising:

a seismic cable (Fig. 1) ([0020]; [0022]); and

an inertial measurement unit 220 coupled to the seismic cable at a known point and from which the movement of the seismic cable can measured during a seismic survey such that the position of the known point during the marine seismic survey can be determined ([0021]; [0024-0039]).

With regard to claim 26, Wilson discloses that the seismic cable comprises one of a streamer and an ocean bottom cable ([0022]).

With regard to claim 27, Wilson discloses that the seismic cable includes one of a sensor module, a steering device, and an inertial positioning device in which the inertial measurement unit is housed ([0020-0021]; [0024-0025]; [0028-0034]).

With regard to claim 28, Wilson discloses that the seismic cable includes a plurality of acoustic receivers ([0020-0022]).

With regard to claim 29, Wilson discloses that the plurality of acoustic receivers comprise a plurality of hydrophones or a plurality of geophones ([0020]; [0031]).

With regard to claim 30, Wilson discloses that the inertial measurement unit is housed within an inertial positioning device ([0020-0021]; [0024-0025]; [0028-0034]).

With regard to claim 31, Wilson discloses that the inertial positioning device further comprises:

a power system for the inertial measurement units;

a communication interface; and

a battery powering the power system and the communication interface ([0020-0021]; [0024-0025]; [0028-0034]).

With regard to claim 32, Wilson discloses that at least one of the inertial measurement units comprises a plurality of accelerometers and gyroscopes ([0024-0028]).

With regard to claim 33, Wilson discloses that the inertial measurement unit comprises a micro-electromechanical inertial measurement unit ([0026]). The ADXL202/210 accelerometer is a MEMS inertial measurement unit (See Analog Devices ADXL202/ADXL210).

With regard to claim 34, Wilson discloses that the inertial positioning device further comprises an acoustic node determined by either an acoustic source or receiver ([0030]).

With regard to claim 35, Wilson discloses that the acoustic source comprises one of an ultra-short baseline acoustic system, a short baseline acoustic system, or a distance measurement acoustic system ([0030]).

With regard to claim 36, Wilson discloses a method for use in a marine seismic survey (abstract), comprising:

taking inertial measurements of movement of selected points on a seismic spread relative to at least one known point (Fig. 1) ([0021]; [0024-0039]).; and

applying the inertial measurements to the known point to determine the positions of the selected points ([0021]; [0024-0039]).

With regard to claim 37, Wilson discloses that taking the inertial measurements includes taking the inertial measurements during at least one of deploying the spread, retrieving the spread and conducting a survey ([0024-0039])..

With regard to claim 38, Wilson discloses supplementing the inertial measurements ([0027-0030])

With regard to claim 39, Wilson discloses that supplementing the inertial measurements comprises at least one of calibrating the positions using a coordinate history determined from acoustic ranging signals and integrating one dimensional measures ([0027-0030])

With regard to claim 40, Wilson discloses deploying the seismic spread at the known point ([0020-0022]; [0031-0039]).

With regard to claim 41, Wilson discloses that deploying the seismic spread at the known point includes one of deploying the seismic spread to the bottom of a body of water and deploying the seismic spread near to the surface of the body of water ([0020-0022]; [0031-0039]).

With regard to claim 42, Wilson discloses that deploying the seismic spread at the known point includes deploying the seismic spread in one of saltwater, fresh water, and brackish water ([0005]; [0020]).

With regard to claim 43, Wilson discloses housing an inertial measurement unit in a seismic survey object ([0021]; [0024-0030]).

With regard to claim 44, Wilson discloses that housing the inertial measurement unit in a seismic survey object includes housing the inertial measurement unit in one of a seismic cable, a seismic receiver, a steering device, and a seismic source ([0020-0021]; [0030]).

With regard to claim 45, Wilson discloses that taking inertial measurements of the movement of selected points on the seismic spread includes taking inertial measurements of the movement of selected seismic survey objects ([0020-0022]; [0030-0039]).

With regard to claim 46, Wilson discloses that taking inertial measurements of the movement of selected seismic survey objects includes taking inertial measurements of the movement of at least one of a seismic cable, a seismic receiver, a steering device, and a seismic source ([0020-0021]; [0030]).

With regard to claim 47, Wilson discloses that the seismic cable includes seismic survey objects having known relative orientations with respect to the selected points on the seismic cable, and the method further comprises determining positions of the selected seismic survey objects based on the determined positions of the selected points and the known relative orientations ([0020-0022]; [0030-0039]) (Fig. 1).

With regard to claim 48, Wilson discloses a method for use in a marine seismic survey (abstract), comprising:

deploying a seismic cable at a known point (Fig. 1) ([0020-0022]; [0031-0039]);

taking inertial measurements of movement of selected points on the seismic cable relative to the known point during the deployment ([0011]; [0020-0022]; [0030-0039]); and

applying the inertial measurements to the known point to determine the positions of the selected points ([0020-0022]; [0030-0039]).

With regard to claim 49, Wilson discloses that the seismic cable includes seismic survey objects having known relative orientations with respect to the selected points on the seismic cable, and the method further comprises determining positions of the selected seismic survey objects based on the determined positions of the selected points and the known relative orientations ([0020-0022]; [0030-0039]) (Fig. 1).

With regard to claim 50, Wilson discloses that deploying the seismic cable comprises one of deploying the seismic cable to the bottom of the water and deploying the seismic cable near to the surface of the water ([0022]).

With regard to claim 51, Wilson discloses supplementing the inertial measurements ([0027-0030]).

With regard to claim 52, Wilson discloses that supplementing the inertial measurements comprises at least one of calibrating the positions using a coordinate history determined from acoustic ranging signals and integrating one dimensional measures ([0027-0030]).

With regard to claim 53, Wilson discloses that deploying the seismic cable at the known point includes one of deploying the seismic cable to the bottom of a body of water and deploying the seismic cable near to the surface of the body of water ([0022]).

With regard to claim 54, Wilson discloses that deploying the seismic cable at the known point includes deploying the seismic cable in one of saltwater, fresh water, and brackish water ([0005]; [0020]).

With regard to claim 55, Wilson discloses housing an inertial measurement unit in a seismic survey object comprising a portion of the seismic cable ([0021]; [0024-0030]).

With regard to claim 56, Wilson discloses that housing the inertial measurement unit in a seismic survey object includes housing the inertial measurement unit in one of a seismic receiver, a steering device, and a seismic source ([0021]; [0024-0030]).

With regard to claim 57, Wilson discloses that taking inertial measurements of the movement of selected points on the seismic cable includes taking inertial measurements of the movement of selected seismic survey objects comprising a portion of the seismic cable ([0020-0022]; [0030-0039]) (Fig. 1).

With regard to claim 58, Wilson discloses that taking inertial measurements of the movement of selected seismic survey objects includes taking inertial measurements of the movement of at least one of a seismic receiver, a steering device, and a seismic source ([0020-0022]; [0030-0039]) (Fig. 1).

With regard to claim 59, Wilson discloses a method for use in a marine seismic survey (abstract), comprising:

conducting a survey with a seismic spread deployed from at least one known point ([0020-0022]; [0029-0036]);

taking inertial measurements of movement of selected points on the seismic spread relative to the known point during the conduct of the seismic survey ([0034-0039]); and

applying the inertial measurements to the known point to determine the positions of the selected points ([0030-0039]).

With regard to claim 60, Wilson discloses supplementing the inertial measurements ([0027-0030]).

With regard to claim 61, Wilson discloses that supplementing the inertial measurements comprises at least one of calibrating the positions using a coordinate history determined from acoustic ranging signals and integrating one dimensional measures ([0027-0030]).

With regard to claim 62, Wilson discloses deploying the seismic spread at the known point ([0020-0022]; [0029-0036]) (Fig. 1).

With regard to claim 63, Wilson discloses that deploying the seismic spread at the known point includes one of deploying the seismic spread to the bottom of a body of water and deploying the seismic spread to the surface of the body of water ([0022]).

With regard to claim 64, Wilson discloses that deploying the seismic spread at the know point includes deploying the seismic spread in one of saltwater, fresh water, and brackish water ([0005]; [0020]).

With regard to claim 65, Wilson discloses housing an inertial measurement unit in a seismic survey object ([0021]; [0024-0030]).

With regard to claim 66, Wilson discloses that housing the inertial measurement unit in a seismic survey object includes housing the inertial measurement unit in one of a seismic cable, a seismic receiver, a steering device, and a seismic source ([0021]; [0024-0030]).

With regard to claim 67, Wilson discloses that taking inertial measurements of the movement of selected points on the seismic spread includes taking inertial measurements of the movement of selected seismic survey objects ([0020-0022]; [0030-0039]) (Fig. 1).

With regard to claim 68, Wilson discloses that taking inertial measurements of the movement of selected seismic survey objects includes taking inertial measurements of the movement of at least one of a seismic cable, a seismic receiver, a steering device, and a seismic source ([0020-0022]; [0030-0039]) (Fig. 1).

With regard to claim 69, Wilson discloses that the seismic cable includes seismic survey objects having known relative orientations with respect to the selected points on the seismic cable, and the method further comprises determining positions of the selected seismic survey objects based on the determined positions of the selected points and the known relative orientations. ([0020-0022]; [0030-0039]) (Fig. 1).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SCOTT A. HUGHES whose telephone number is (571)272-6983. The examiner can normally be reached on M-F 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Scott A. Hughes/
Examiner, Art Unit 3663